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UHLIR, NIKOLAS J

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/581,447	Applicant(s) MURATA ET AL.	
	Examiner Nikolas J. Uhlir	Art Unit 1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 August 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-5,7-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-5 and 7-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following problem: Chemical formula's 3, 4, 6, and 8 are incorrect. In these formulas, the applicants have defined the following 2 structures for a urethane methacrylate: A: $\{(CH_2=CR_1COO)_k\text{-}R_2\text{-}O\text{-}CONH\}_l\text{-}X$ (formulas 3 and 6) and B: $\{[(CH_2=CR_1\text{-}COO)_k\text{-}R_2\text{-}O\text{-}CONH)]_m\text{-}X\text{-}NHCO\}_n\text{-}Y$ (formulas 4 and 8). In each of these formulas, X is isocyanate. It should be noted that the CONH groups in formulas 3, 4, 6, and 8 and the CONH groups of formulas 4 and 8 are residues of isocyanate compounds. It is unclear to the examiner how a formula having 2 isocyanate groups linked to one another can be formed. Applicant is referred to pages 59-61 of the specification wherein the applicant details 8 methods for synthesizing the urethane methacrylates of the claimed invention. These examples illustrate that the urethane methacrylate compound of the current application is formed by reacting acrylate compounds such as pentaerithrytol triacrylate and pentaerithrytol tetracrylate with various diisocyanate compounds, including hexamethylene diisocyanate, tolylene diisocyanate, 4-4'-diphenylmethane diisocyanate, xylylene diisocyanate, and isophorone diisocyanate. This will result in a structure having an isocyanate connected the acrylate mentioned above, and an R group, namely a hexamethylene, tolylene, 4-4'-diphenylmethane, xylylene or isophorone. This R group is missing from the structure of chemical formulas 3, 4, 6 and 8.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 7-9 and 13 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In the instant case, claim 13 requires a hardcoat comprising a urethane methacrylate having 1 of the two structures listed. As stated above in the objection to the specification, these formulas are incorrect, as the formulas are lacking a required R group between the isocyanate groups, as stated above. While the applicant has certainly provided adequate description in the specification for how to make the urethane acrylate hardcoat, the processes elucidated on pages 59-61 of the specification (reacting an acrylate with a diisocyanate) for manufacturing this compound will result in a urethane methacrylate having an R group between the two isocyanate groups in each of these formulas. Thus, the applicant has not provided adequate description in the specification to enable one of ordinary skill in the art to make and use a urethane acrylate compound having two isocyanate groups that are not separated by an R group. Correction is required.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "high" in claim 13 is a relative term which renders the claim indefinite. The term "high" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Clarification is required.

6. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In the instant case, claim 7 requires the hardcoat to have a particle size of 30nm or less. It is unclear to the examiner how a film coating can have a particle size. The examiner believes the applicant intends to require the ultrafine particles of claim 13 to have a particle size $\leq$ 30nm. Correction is required.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1, 3-5, 10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oka et al. (US5747152) in view of Ishii et al. (JP10017632).

9. For the purpose of this examination, the examiner has relied upon a machine translation of the Ishii et al. document to provide basis for this rejection. All references to

the Ishii et al. document refer to the machine translation, unless otherwise specifically noted.

10. Regarding the limitations of claim 1, wherein the applicant requires an antireflection material comprising a transparent substrate, a hard coat layer provided on one or two surfaces of the substrate either directly or via another layer, an antireflection film having a lower refractive index than said hard coat layer further provided on a surface of the hard coat layer, wherein the hard coat comprises a copolymer of at least a methacrylate having a fluorene structure and a urethane methacrylate.

11. Oka et al. teaches an antireflection film comprising a transparent substrate, a hard coat formed on the transparent substrate, and a secondary coating (equivalent to applicants claimed antireflection layer) deposed on the hard coat layer, wherein the secondary coating has a lower refractive index then the hard coat layer (column 11, line 45-column 13, line 65). Oka et al. teaches that UV curable resins containing acrylate functional groups are suitable for use as the binder resin for the hard-coat layer. Urethane acrylates are preferred (column 13, lines 23-25 and column 13, lines 48-51).

12. Oka et al. fails to teach a hardcoat that comprises a copolymer of a urethane methacrylate with a methacrylate having a fluorene structure.

13. However, Ishii et al. teaches a resin composition the comprises urethane methacrylate that is formed by reacting a polyol having a fluorene structure with a polyisocyanate compound and a hydroxylated methacrylate (abstract and section 0038). It is the examiners position that the compound resulting from this reaction is analogous to a copolymer of a urethane methacrylate and a methacrylate having a fluorene

structure, in that the resulting polymer composition will posess both urethane bonds and methacrylate groups. This resin composition is useful as a protective coating for lenses (section 0033), and possesses high strength, refractive index and clarity (abstract).

14. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the resin composition taught by Ishii et al. as the resin binder of the hardcoat layer taught Oka et al.

15. One would have been motivated to make such a modification due to the high strength, high refractive index, and good clarity of the hardcoat layer one would expect to gain as a result.

16. Regarding the limitations of claim 3, wherein the applicant requires the hardcoat layer to contain filler having a refractive index between 1.6-2.7. Oka et al. teaches that the hard coat layer comprises a resin containing ultra fine particles having a high refractive index (column 12, lines 1-13). Examples of particles having high refractive index used in the hard coat layer are ZnO (n=1.9), and TiO_2 (n=2.3-2.7) (column 11, lines 55-67, and column 21, lines 59-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to select either ZnO or TiO_2 as the hardcoat filler, as they are taught to be equivalent to the other materials listed. Thus, the limitations of claim 3 are met by the combination of Oka et al. with Ishii et al. when TiO_2 or ZnO are selected as the filler powder, as the combination would result in a hardcoat comprising a copolymer of a urethane methacrylate and a methacrylate having a fluorene structure, wherein the hardcoat contains a high index of refraction filler powder having a refractive index between 1.6-2.7.

17. Regarding the limitations of claim 4, wherein the applicant requires the antireflection film to have a critical surface tension of 20 dynes/cm. Although Oka et al. does not explicitly teach this property, Oka et al. does teach that suitable materials for the low refractive index secondary layer include LiF (n=1.4), MgF_2 (n=1.4), AlF_3 (n=1.4), and particles thereof (column 12, line 13 and column 22, lines 50-55). These materials exactly match the materials specified by the applicant on page 35 of the specification as suitable secondary layer materials that possess this property. Thus, the examiner takes the position that this limitation is met.

18. Regarding the limitations of claim 5 wherein the applicant requires the hardcoat and anti reflection layer to be provided via a polarization substrate. Oka et al. teaches a polarizing plate that comprises a polarizing element that has been adhesively bonded to the underside of the antireflection film, as shown in figure 19 (column31, lines 21-47). Thus, this limitation is met.

19. Regarding the limitations of claim 10, wherein the applicant requires a radiation and/or thermosetting resin for the hardcoat, and titanium oxide particles that have been surface treated with an oxide or hydroxide of at least one element selected from silicon, zirconium, aluminum, tin, and cesium. Oka et al. teaches that TiO_2 is one of several suitable materials that are useful as the particulate filler in the hardcoat layer, as stated above for claim 3. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select TiO_2 as the filler material in the hardcoat layer due to the teaching in Oka et al of the equivalence of TiO_2 to the other materials listed as a suitable material for the hardcoat filler. Further, Oka et al. teaches that the ultrafine

particles may be coated with a layer of colloidal silica to render them highly hydrophobic, thereby increasing the adhesion of the particles to the binder resin (column 12, lines 36-50). Thus, the limitation of claim 10 requiring TiO_2 particles to be coated with an oxide of silica is met. Regarding the limitation in claim 10 requiring the hardcoat to be either radiation curable and/or thermosetting, Ishii et al. teaches that the resin material is curable with Visible, U.V. or infrared radiation (section 0026). Thus, this limitation is met.

20. Regarding the limitations of claim 12, wherein the applicant requires a polarization film having a hardcoat layer and a antireflection layer on one die of the substrate, and a protecting layer provided on the opposite side of the side of the substrate. As stated above for claim 5, Oka et al. teaches adhesively bonding a polarization element to the bottom of the antireflection film. Further, Oka et al. teaches applying a triacetyl cellulose layer (29) to the bottom of the polarization element (column 31, lines 38-47). It is the examiners position that this triacetyl cellulose layer will provide protection to the polarization layer to some degree simply by being present. Thus, the limitations of claim 12 are met.

21. Claims 7-9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oka et al. in view of Lim et al. (US5880171).

22. For the purpose of this examination, the examiner has interpreted the structures present in claim 13 to require an R group between the isocyanate groups.

23. Regarding the limitations of claim 13, wherein the applicant requires an antireflection material comprising a transparent substrate, a hardcoat layer provide on

one or two surfaces of the substrate, an antireflection layer formed on the hardcoat layer, wherein the hard-coat comprises ultrafine particles having a high refractive index, and a polymer polymerizing a urethane methacrylate compound having one of the chemical formulas disclosed.

24. Oka et al. teaches an antireflection film comprising a transparent substrate, a hard coat formed on the transparent substrate, and a secondary coating (equivalent to applicants claimed antireflection layer) deposed on the hard coat layer, wherein the secondary coating has a lower refractive index then the hard coat layer (column 11, line 45-column 13, line 65). Oka et al. teaches that UV curable resins containing acrylate functional groups are suitable for use as the binder resin for the hard-coat layer. Urethane acrylates are preferred (column 13, lines 23-25 and column 13, lines 48-51). Further, Oka et al. teaches that the hard coat layer contains ultra fine particles having a high refractive index (column 12, lines 1-13). Examples of these particles include ZnO (n=1.9), and TiO_2 (n=2.3-2.7) (column 11, lines 55-67, and column 21, lines 59-67). Oka et al. defines "ultrafine particles" as particles having an average diameter not more than 200nm, preferably between 5-70nm (Column 12, lines 17-22).

25. Oka et al. fails to teach a hardcoat composition comprising a urethane methacrylate having one of the formulas in claim 13.

26. However, Lim et al. teaches a polymer composition for an ophthalmic lens that comprises a urethane acrylate (column 6, line 20-column 8, line 15). Lim teaches a specific urethane acrylate having the structure: P-(OCONH-R-NHCOO-A-$OCOCH=CH_2)_n$, where P is an aliphatic or aromatic polyether, R is the residue of the

diisocyanate to which the isocyanate moieties are attached, n-2 or 3 and A is an aliphatic or aromatic ester portion of a hydroxylated acrylate or methacrylate (column 7, lines 20-31). This urethane acrylate matches the first specified in claim 13, with an R group inserted between the 2 isocyanate groups. This material exhibits good chemical resistance and thermo-mechanical stability (column 7, line 62-column 8, line 2).

27. Therefore it would have been obvious to one of ordinary skill in the art to use the urethane methacrylate taught by Lim et al. as the binder for the hardcoat taught by Oka et al.

28. One would have been motivated to make such a modification due to the teaching in Oka et al. that urethane acrylates were particularly preferred binders for the hardcoat layer, and the teaching in Lim et al. of a specific urethane acrylate suitable for use with lenses that has good chemical resistance and thermo-mechanical stability.

29. Regarding the limitations of claim 7, wherein the applicant requires the hard coat layer to have a particle size $\leq$ 30nm. For the purpose of this examination the examiner has interpreted claim 7 to require that the particles present in the hardcoat of claim 13 have a particle size $\leq$ 30nm.

30. With respect to this limitation, Oka et al. teaches that the ultrafine particles in the hardcoat layer have a particle size between 5-200nm, preferable 5-70nm, as stated above for claim 13. These ranges overlap the ranges required by the applicant. Thus, the examiner takes the position that the limitations of claim 7 are met when the particle size is between 5-30nm.

31. Regarding the limitations of claim 8, wherein the applicant requires the antireflection material to have a critical surface tension of 20 dynes/cm or less. Although oka et al. does not explicitly teach this property, Oka et al. does teach that suitable materials for the low refractive index secondary layer include LiF (n=1.4), MgF_2 (n=1.4), AlF_3 (n=1.4), and particles thereof (column 12, line 13 and column 22, lines 50-55). These materials exactly match the materials specified by the applicant on page 35 of the specification as suitable secondary layer materials that possess this property. Thus, the examiner takes the position that the critical surface tension limitation is met.

32. Regarding the limitations of claim 9, wherein the applicant requires a polarization film wherein a protecting layer is laminated on the opposite side of the surface of the transparent substrate of the antireflection material of claim 13, wherein the hardcoat layer and antireflection layer are provided via a polarization substrate. Oka et al. teaches adhesively bonding a polarization element to the bottom of the antireflection film. Further, Oka et al. teaches applying a triacetyl cellulose layer (29) to the bottom of the polarization element (column 31, lines 38-47). It is the examiners position that this triacetyl cellulose layer will provide protection to the polarization layer to some degree simply by being present. Thus, the limitations of claim 9 are met.

Response to Arguments

33. Applicant's arguments with respect to claims 1-12 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

34. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nikolas J. Uhlir whose telephone number is 703-305-0179. The examiner can normally be reached on Mon-Fri 7:30 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Thibodeau can be reached on 703-308-2367. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

NJU

STEVAN A. RESAN
PRIMARY EXAMINER